

Trend Study 17-24-97

Study site name: Heisett's Hollow

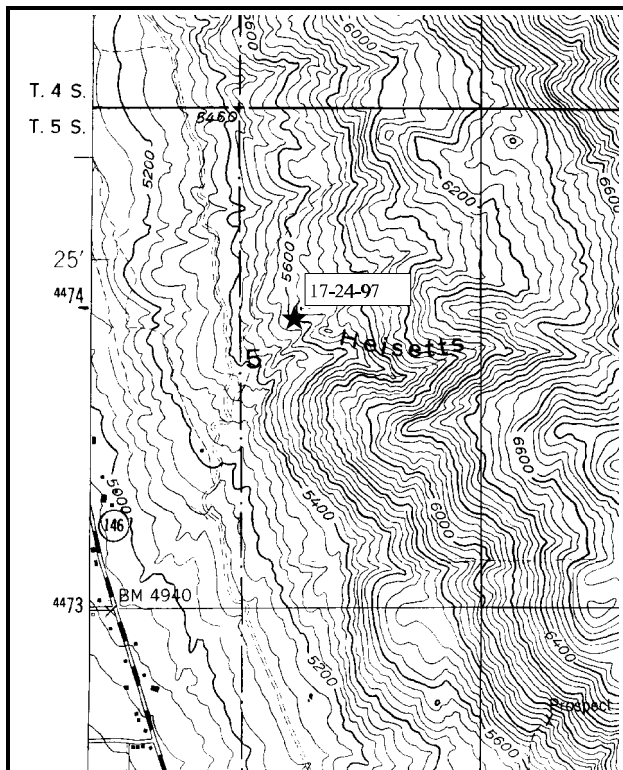
Range Type: Big sagebrush-grass

Compass bearing: frequency baseline 136 degrees. (Lines 2-4 28°M)

First frame placement on frequency belts 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

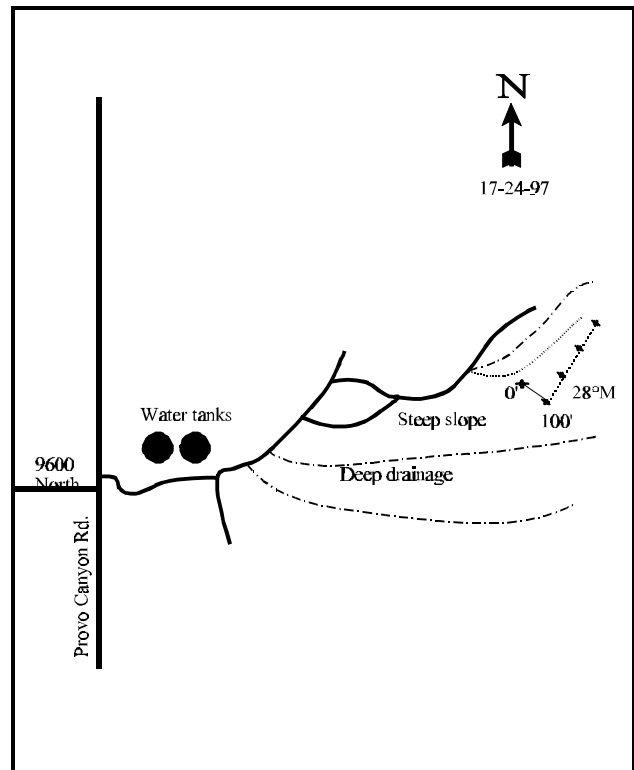
LOCATION DESCRIPTION

North of Pleasant Grove, turn east off Canyon Road (Rt 146) opposite 9600 North, and go 0.4 miles towards the water tank on the hill. From the southeast side of the concrete tank, go northerly 0.15 miles to a fork. Bear right up the steep, eastern most road and continue 0.15 miles to the Forest Service boundary. Go 0.1 miles to a fork, continue east 0.1 miles up a steep slope to a small level area. A deer trail goes southeast. Follow the trail 65 paces to the 0-foot baseline stake.



Map Name: Timpanogos Cave

Township 5S, Range 2E, Section 5



Diagrammatic Sketch

UTM 4473919.896 N, 437113.549 E

DISCUSSION

Trend Study No. 17-24 (19-4)

The Heisette Hollow study is located on the upper Lake Bonneville terrace near the mouth of Heisette Hollow and uphill from the Salt Lake Aqueduct. This entire area is considered critical deer winter range. An old browse transect which samples the few Stansbury cliffrose plants present is located in the immediate area. Judging from browse utilization and the number of pellet groups present, deer use is heavy. Slope varies from about 5% at the 0-foot baseline stake to nearly 49% at the end of the baseline. Aspect is south-southeast to south-southwest, depending on one's position along the baseline. Elevation is 5,560 feet. The range type is a relatively low density mountain big sagebrush community interspersed with isolated oak clones and few large cliffrose plants. A moderately dense and vigorous perennial grass cover occupies the shrub interspaces.

Soil is a clay loam containing a moderate amount of rock in the profile. Texture is gravelly to sandy and typical of sedimentary lake deposits. Effective rooting depth (see methods) is 24 inches, some of which is unconsolidated "C" horizon. Phosphorous may be limiting to plant development (5.7 ppm) where it is thought that 10 ppm is the minimum necessary. The steeper slopes show signs of erosion problems in the past, leaving behind some steep terraces, as well as some pedestalling of the plants. Currently, there does not appear to be any active erosion. A foot trail is located directly north of the site with soil movement evident on the trail.

The key browse species is a sparsely distributed population of mountain big sagebrush. The increased sample size used in 1997 indicates an estimated density of 1,120 plants/acre, a slight increase from the 866 plants/acre estimated in 1983 and 1989. Utilization is moderate to heavy. The percent of heavily hedged plants has declined since 1989 as have those classified with poor vigor. Percent decadency has declined since 1989, making it similar to that of 1983. One alarming change is how the density of the broom snakeweed has increased from an estimated 1,433 plants/acre in 1989 to 10,300 plants/acre in 1997. The number of seedlings encountered is also a concern, but many of these plants may not become established. Average height is only 6 inches, although these plants will compete for water resources and possibly prohibit mountain big sagebrush seedlings from establishing in the future. Other browse species have relatively stable populations, yet comprise only a minor portion of browse composition.

Perennial grasses are the dominant herbaceous understory component. With the exclusion of livestock grazing, bluebunch wheatgrass is becoming vigorous and abundant. It comprises a uniform but somewhat open cover that helps stabilize soil. Bulbous bluegrass and Sandberg bluegrass are present. Cheatgrass is present but not very abundant.

The forb component is subject to grass competition. As a result, forbs occur infrequently. The more common species include northern sweetvetch, longleaf phlox, ragweed, and scarlet globemallow. Little vegetative cover or forage is provided by forbs.

1983 APPARENT TREND ASSESSMENT

Soil trend is stable on a highly erodible and sensitive site. Past erosion has been severe but is slowly being stabilized by an aggressive and increasing perennial grass cover. Vegetation trend for big game habitat purposes is definitely down. All the available evidence points to a rapidly decreasing population of mountain big sagebrush, the key browse species. Other desirable browse species are barely maintaining current population levels. Broom snakeweed appears to be increasing at a rapid rate.

1989 TREND ASSESSMENT

This section of the hill is subject to subsidence, and recent cracking and slumping have occurred. It appears the site will eventually slide down into the large gully below. Adjacent slopes are subject to severe gullying. The study site has adequate grass cover, however total combined cover from vegetative and litter show a slight decrease. Pavement cover increased from 7 to 20%. The percent bare soil is similar between years. The soil trend is slightly downward. The 1989 data demonstrates that the increaser subshrub broom snakeweed is not a good indicator of trend. Although it was apparently rapidly expanding in 1983, the snakeweed now has a largely decadent population. The short statured oakbrush on the site is heavily hedged and has expanded slightly. No changes are apparent in the heavily browsed cliffrose population and the more infrequent shrubs were not adequately sampled. Perennial grasses still predominate in the understory. The small bluegrasses and bluebunch wheatgrass maintained comparable quadrat frequencies. Not counting the abundant annual weeds, forb frequency and composition is unchanged and insignificant.

1997 TREND ASSESSMENT

The soil trend is stable. Some past erosion has occurred as well as plant pedestaling. Current erosion does not appear to be significant and not more than would be expected. The adjacent foot trail shows signs of erosion which could eventually adversely affect the site. The mountain big sagebrush population is moderate to heavily hedged, but the percentage of heavily hedged plants has declined since 1989. Seedlings and young plants are sparse with 70% of the plants encountered classified as mature. The broom snakeweed population has expanded quickly to over 10,000 plants/acre being sampled in 1997. The browse trend is slightly downward at this time due to this great increase. This species can have highly fluctuating populations and this community should be monitored closely. Nested frequency for bluebunch wheatgrass continues to increase with only a sparse cover value for cheatgrass. Bulbous bluegrass also has a relatively high cover value with a very short growth form. Forbs are insignificant on the site at this time. Herbaceous trend is slightly upward.

TREND ASSESSMENT

soil - stable

browse - slightly downward with the great increase in broom snakeweed density

herbaceous understory - slightly upward

HERBACEOUS TRENDS --

Herd unit 17 , Study no: 24

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '97
		'83	'89	'97	'83	'89	'97	
G	Agropyron cristatum	b ⁹	b ⁷	a ⁻	5	5	-	-
G	Agropyron dasystachyum	c ⁸⁶	b ⁸	a ⁻	33	4	-	-
G	Agropyron spicatum	a ¹⁹⁶	b ²³⁷	c ²⁸⁹	76	82	85	20.39
G	Bromus tectorum (a)	-	-	133	-	-	49	1.51
G	Poa bulbosa	b ²⁸⁴	a ¹²⁰	c ³⁰⁷	89	59	89	16.68
G	Poa secunda	a ⁻	c ²⁹⁹	b ²⁸	-	95	14	.17
Total for Grasses		575	671	757	203	245	237	38.76

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % '97
		'83	'89	'97	'83	'89	'97	
F	Alyssum alyssoides (a)	-	-	128	-	-	49	.49
F	Allium spp.	-	-	3	-	-	1	.00
F	Ambrosia psilostachya	_a -	_c 52	_b 35	-	27	15	.18
F	Artemisia ludoviciana	3	2	-	1	1	-	-
F	Arabis perennans	-	-	2	-	-	1	.03
F	Astragalus spp.	-	2	-	-	1	-	-
F	Astragalus utahensis	-	-	3	-	-	1	.15
F	Castilleja chromosa	7	1	2	3	1	1	.00
F	Calochortus nuttallii	_b 7	_{ab} 1	_a -	4	1	-	-
F	Cirsium spp.	_a -	_a 2	_b 11	-	1	8	.19
F	Comandra pallida	4	8	3	2	3	3	.01
F	Crepis acuminata	-	-	5	-	-	2	.01
F	Erodium cicutarium (a)	-	-	44	-	-	19	.26
F	Helianthus annuus (a)	-	17	-	-	7	-	-
F	Hedysarum boreale	12	11	26	6	5	11	.71
F	Lactuca serriola	-	-	1	-	-	1	.00
F	Lithospermum ruderales	-	3	3	-	2	2	.01
F	Oenothera albicaulis (a)	2	-	5	1	-	3	.33
F	Orobancha spp.	5	-	-	2	-	-	-
F	Phlox longifolia	_a 3	_a 6	_b 28	1	4	12	.08
F	Sphaeralcea coccinea	8	7	6	4	2	2	.03
F	Tragopogon dubius	_a 2	_a -	_b 31	2	-	14	.24
F	Unknown forb-perennial	-	3	-	-	1	-	-
Total for Forbs		53	115	336	26	56	145	2.76

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd Unit: 17, Study no: 24

T y p e	Species	Strip Frequency '97	Average Cover % '97
B	Artemisia tridentata vaseyana	35	8.28
B	Atriplex confertifolia	1	.03
B	Cercocarpus montanus	1	.15
B	Chrysothamnus nauseosus albicaulis	4	.15
B	Gutierrezia sarothrae	72	3.59
Total for Browse		113	12.21

BASIC COVER --

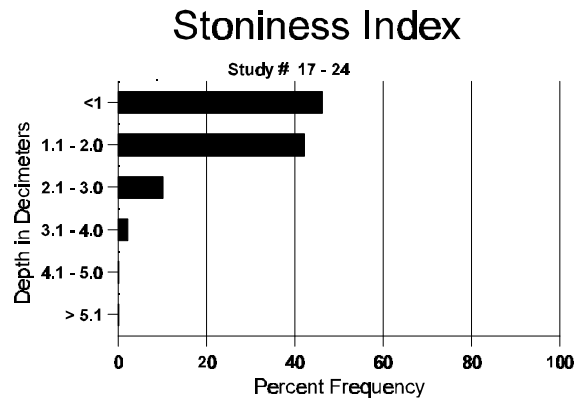
Herd unit 17 , Study no: 24

Cover Type	Nested Frequency '97	Average Cover %		
		'83	'89	'97
Vegetation	381	7.00	22.25	53.82
Rock	172	3.00	4.50	4.96
Pavement	245	6.75	19.75	6.84
Litter	388	72.50	41.00	39.14
Cryptogams	43	.25	0	.59
Bare Ground	190	10.50	12.50	7.46

SOIL ANALYSIS DATA --

Herd Unit 17, Study no: 24

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
24.3	49.6 (17.7)	7.1	32.0	35.4	32.6	3.8	5.7	105.6	.6



PELLET GROUP FREQUENCY --

Herd unit 17 , Study no: 24

Type	Quadrat Frequency '97
Rabbit	1
Elk	1
Deer	43

BROWSE CHARACTERISTICS --

Herd unit 17 , Study no: 24

A Y G R E	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total	
	1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.		
Amelanchier alnifolia																		
M	83	-	-	1	-	-	-	-	-	-	-	-	1	-	33	30	35	1
	89	-	-	1	-	-	-	-	-	-	-	-	-	1	33	28	31	1
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>						<u>%Change</u>				
'83		00%			100%			100%						+ 0%				
'89		00%			100%			100%						Died out				
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	33	Dec:	-			
												'89	33		-			
												'97	0		-			

A Y G R E	Form Class (No. of Plants)	Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total									
		1	2	3	4		5	6		7	8	9	1	2	3	4		
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	83	-	-	1	-	-	-	-	-	-	1	-	-	-	33			1
	89	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	83	-	8	12	-	-	-	-	-	-	15	-	-	5	666	22	28	20
	89	-	1	12	-	-	-	-	-	-	12	1	-	-	433	24	29	13
	97	-	23	15	1	-	-	-	-	-	39	-	-	-	780	25	47	39
D	83	-	1	1	3	-	-	-	-	-	1	-	1	3	166			5
	89	-	2	10	-	-	-	-	-	-	10	1	-	1	400			12
	97	4	7	2	-	-	-	-	-	-	5	1	-	7	260			13
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	240			12
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		35%			54%			35%			+ 0%							
'89		15%			85%			04%			+23%							
'97		54%			30%			13%										
Total Plants/Acre (excluding Dead & Seedlings)											'83	865	Dec:	19%				
											'89	866		46%				
											'97	1120		23%				
Atriplex confertifolia																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20	15	27	1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			None							
'89		00%			00%			00%			Appeared							
'97		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)											'83	0	Dec:	-				
											'89	0		-				
											'97	20		-				

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Cercocarpus montanus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	1	-	-	-	-	-	-	1	-	-	-	33		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	-	-	1	-	-	-	-	-	-	1	-	-	-	20	70 127	1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			Appeared							
'89		00%			100%			00%			-39%							
'97		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	33		-			
												'97	20		-			
Chrysothamnus nauseosus albicaulis																		
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	33	20 24	1	
	89	2	-	-	-	-	-	-	-	-	-	2	-	-	66	26 26	2	
	97	4	-	-	-	-	-	-	-	-	3	1	-	-	80	28 48	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			+50%							
'89		00%			00%			00%			+18%							
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	33	Dec:	-			
												'89	66		-			
												'97	80		-			
Cowania mexicana stansburiana																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	38 48	0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			None							
'89		00%			00%			00%			None							
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	0	Dec:	-			
												'89	0		-			
												'97	0		-			

A G E	Y G R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Gutierrezia sarothrae																		
S	83	123	-	-	-	-	-	-	-	-	123	-	-	-	4100		123	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	445	-	-	-	-	-	-	-	-	445	-	-	-	8900		445	
Y	83	22	-	-	-	-	-	-	-	-	22	-	-	-	733		22	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	214	-	-	-	-	-	-	-	-	214	-	-	-	4280		214	
M	83	15	-	-	-	-	-	-	-	-	15	-	-	-	500	11	8	
	89	22	-	-	-	-	-	-	-	-	16	-	6	-	733	9	8	
	97	299	-	-	-	-	-	-	-	-	299	-	-	-	5980	6	7	
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	21	-	-	-	-	-	-	-	-	8	-	10	3	700		21	
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		00%			00%			00%			+14%							
'89		00%			00%			44%			+86%							
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	1233	Dec:	0%			
												'89	1433		49%			
												'97	10300		0%			
Quercus gambelii																		
Y	83	-	-	1	-	-	-	-	-	-	-	-	1	-	33		1	
	89	-	-	5	1	-	-	-	-	-	2	4	-	-	200		6	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	83	-	1	2	-	-	-	-	-	-	2	-	1	-	100	33	35	
	89	-	-	4	-	-	1	-	-	-	5	-	-	-	166	59	33	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	52	43	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'83		25%			75%			50%			+64%							
'89		00%			91%			00%			Died out							
'97		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'83	133	Dec:	-			
												'89	366		-			
												'97	0		-			